

PATENT
SONY-15200

**A METHOD OF AND APPARATUS FOR
CANCELLING A PENDING AV/C NOTIFY COMMAND**

FIELD OF THE INVENTION:

5 The present invention relates to the field of sending and receiving commands between devices coupled together within a network. More particularly, the present invention relates to the field of sending and receiving AV/C command frames for inquiring about status and change of state of target devices.

BACKGROUND OF THE INVENTION:

10 The IEEE standard, "IEEE 1394-2000 Standard For A High Performance Serial Bus," Draft ratified in 2000, is an international standard for implementing an inexpensive high-speed serial bus architecture which supports both asynchronous and isochronous format data transfers. Isochronous data transfers are real-time transfers which take place such that the time intervals between significant instances have the same duration at both the transmitting and receiving applications. Each packet of data transferred isochronously is transferred in its own time period. An example of an ideal application for the transfer of data isochronously would be from a video recorder to a television set. The video recorder records images and sounds and saves the data in discrete chunks or packets. The video recorder then transfers 15 each packet, representing the image and sound recorded over a limited time period, during that time period, for display by the television set. The IEEE 1394-2000 serial bus architecture provides multiple channels for isochronous data transfer between applications. A six bit channel number is broadcast with the data to ensure reception by the appropriate application. This allows multiple applications to simultaneously transmit isochronous data 20 across the bus structure. Asynchronous transfers are traditional data transfer operations which take place as soon as possible and transfer an amount of data from a source to a destination.

25 The IEEE 1394-2000 standard provides a high-speed serial bus for interconnecting digital devices thereby providing a universal I/O connection. The IEEE 1394-2000 standard

defines a digital interface for the applications thereby eliminating the need for an application to convert digital data to analog data before it is transmitted across the bus. Correspondingly, a receiving application will receive digital data from the bus, not analog data, and will therefore not be required to convert analog data to digital data. The cable required by the
5 IEEE 1394-2000 standard is very thin in size compared to other bulkier cables used to connect such devices. Devices can be added and removed from an IEEE 1394-2000 bus while the bus is active. If a device is so added or removed the bus will then automatically reconfigure itself for transmitting data between the then existing nodes. A node is considered a logical entity with a unique address on the bus structure. Each node provides a
10 configuration ROM, a standardized set of control registers and its own address space. Because of these advantages the IEEE 1394-2000 standard provides for a unique networking structure that is capable of incorporating audio/video devices, media play/record devices, computing devices and display devices.

15 The IEEE 1394-2000 standard defines a protocol as illustrated in Figure 1. This protocol includes a serial bus management block 10 coupled to a transaction layer 12, a link layer 14 and a physical layer 16. The physical layer 16 provides the electrical and mechanical connection between a device or application and the IEEE 1394-2000 cable. The physical layer 16 also provides arbitration to ensure that all devices coupled to the IEEE
1394-2000 bus have access to the bus as well as actual data transmission and reception. The
20 link layer 14 provides data packet delivery service for both asynchronous and isochronous data packet transport. This supports both asynchronous data transport, using an acknowledgement protocol, and isochronous data transport, providing real-time guaranteed bandwidth protocol for just-in-time data delivery. The transaction layer 12 supports the commands necessary to complete asynchronous data transfers, including read, write and lock.
25 The transaction layer 12 also provides a path for isochronous management data to be transferred to the serial bus management block 10 via read operations with isochronous control compare-swap registers. The serial bus management block 10 contains an isochronous resource manager for managing isochronous data transfers. The serial bus management block

10 also provides overall configuration control of the serial bus in the form of optimizing arbitration timing, guarantee of adequate electrical power for all devices on the bus, assignment of the cycle master, assignment of isochronous channel and bandwidth resources and basic notification of errors.

5 A diverse range of products can be implemented with the ability to connect to an IEEE 1394-2000 serial bus network. These devices can have capabilities and functionality ranging from very simple to very complex. Specifically, a variety of audio/video devices, media play/record devices and computing/display devices are capable of being linked together over an IEEE 1394-2000 serial bus networking structure to support asynchronous and isochronous data transfers between the devices.

10 The IEEE 1394-2000 serial bus allows a collection of devices to work together in a high bandwidth, distributed environment to maximize the overall efficiency and functionality of the network. This allows manufacturers to remove expensive pieces of functionality from one device and locate that functionality in another device on the network, instead of duplicating this functionality in all devices on the network. While some of the devices have limited functionality and are relatively inexpensive, such devices require the support and interaction of other devices in order to bring the full functionality of the devices within the network to the user.

15 The AV/C Digital Interface Command Set is a command set used for data transactions between consumer audio/video equipment over an IEEE 1394-2000 serial bus. Neither the IEEE 1394-2000 serial bus nor the AV/C command set provide a master-slave relationship between the devices coupled within the IEEE 1394-2000 serial bus network. Instead, both the IEEE 1394-2000 serial bus and the AV/C command set operate based on a cooperative peer-to-peer coexistence of devices within the network. Discrete AV/C command and response 20 data packets are transferred between networked devices over an IEEE 1394-2000 serial bus in an asynchronous data stream. The AV/C command and response data packets are typically 25 formatted according to the AV/C protocol outlined in the AV/C Digital Interface Command Set. Transfers of AV/C command and response data packets over the IEEE 1394-2000 serial